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## **Lower Calories, Lower Fat: Making a Healthier Cake Without Loss of Taste**

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### **Background**

Years ago, I heard a comment that substituting an equal volume of applesauce for the oil called for in a cake recipe results in a cake that tastes the same as the one using oil. Knowing that oil is all fat and applesauce can be zero fat, this seemed like quite a desirable substitution, if indeed the taste remains the same. So I gave it a try the next time I made a cake, which happened to be a chocolate cake from a mix. I'm no cake gourmet, but sure enough, the applesauce, no-oil cake tasted just like a regular chocolate cake, or maybe even a bit better. A week later, I tried it again, with the same positive result, convincing me that the scheme works, at least for chocolate cake. Ever since then, for every cake I've made I've used applesauce rather than oil, and have never once been disappointed.

The question becomes: How much difference does the substitution of applesauce for oil make in the fat and calories of the baked cake?

Here are the basic facts for the particular cake mix and applesauce that I used:

- (1) Cake mix instructions: Add one-half cup oil, water, and eggs to the cake mix.
- (2) Revised instructions: Add one-half cup applesauce, water, and eggs to the cake mix (same amount of water and same number of eggs as in the original instructions).
- (3) Cake mix nutrition facts, for a cake made with one-half cup oil: 12 servings, each with 270 calories, including 130 calories from fat. [These values can vary somewhat from one cake mix to another.]
- (4) Oil facts: 120 calories for each tablespoon of oil, all from fat.
- (5) Applesauce facts: 90 calories and 0 fat in one-half cup of applesauce. [Here too, the exact values can vary depending on the applesauce used.]

**Exercise:**

A. When the half cup of oil is replaced by a half cup of applesauce, how many calories are in each serving of the resulting cake (assuming 12 equal servings)? How many of those calories are from fat?

B. Percentage-wise, what is the reduction in calories, per serving, by substituting applesauce for oil? What is the percentage reduction in calories from fat?

(Hint: There are 8 tablespoons in half a cup.)

**Solution:**Part A

(1) Made with oil, the full cake had  $12 \times 270$  calories = 3240 calories and  $12 \times 130$  calories = 1560 calories from fat.

(2) The half cup of oil contained  $8$  tablespoons  $\times 120$  calories per tablespoon = 960 calories, all from fat.

(3) Replacing the oil by applesauce, with 90 total calories and 0 calories from fat, the resulting cake had  $(3240 - 960 + 90)$  calories = 2370 total calories and  $(1560 - 960 + 0)$  calories = 600 calories from fat, by deleting the contribution from fat and adding the contribution from applesauce.

(4) Dividing the results in (3) by 12, each serving of the cake baked with applesauce rather than oil had 197.5 calories and 50 calories from fat.

Alternatively, the same results for Part A can be obtained by focussing on a single serving of cake from the start, as follows:

(1) Made with oil, each serving has 270 calories and 130 calories from fat (from the information given in the Background).

(2) The half cup of oil contributes  $(120 \text{ calories per tablespoon} \times 8 \text{ tablespoons}) / 12 = 80$  calories to each serving, all from fat.

(3) The applesauce would contribute  $90 \text{ calories} / 12 = 7.5$  calories to each serving and 0 calories from fat.

(4) Replacing the oil by applesauce results in each serving having  $(270 - 80 + 7.5)$  calories = 197.5 calories and  $(130 - 80 + 0) = 50$  calories from fat, by deleting the contribution from fat and adding the contribution from applesauce.

Part B

Per serving, calories were reduced by 72.5, from 270 to 197.5, yielding a reduction of  $(72.5/270) = 26.9\%$ . Calories from fat were reduced by 80, from 130 to 50, yielding a reduction of  $(80/130) = 61.5\%$ .

### **Further Discussion:**

The results yield quite a substantial reduction in calories (26.9%) and in calories from fat (a whopping 61.5%), with no change in the size of the helping and no loss in taste. For anyone who eats cake but wants to cut back on calories or fat, I encourage you to give it a try. My tests were all with chocolate cake, so you could do your own experimentation by trying the applesauce substitution on other cake flavors as well.

With obesity being a serious problem for tens of millions of children and adults, it seems that a slight recipe adjustment that reduces calories and fat while preserving taste and portion size and even the time to make the cake should be a “no brainer” for widespread use. Further, the cost of applesauce is often less than the cost of oil, providing a slight cost advantage to making the substitution. So here is a way to lessen the intake of calories and fat that can be made with no sacrifice – not in taste, serving size, time, or cost. If you ever make cakes, try testing it. Then, if the results are good, help your neighbors and others by spreading the word. Students should be encouraged to test it at home, with their parents, as this is an exercise with the potential for immediate home application. Activists might even want to take an applesauce-substitution campaign to the school cafeteria or elsewhere where cakes are made.